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☞See advertisement on last page.

Poetry.

THE YEAR'S FAREWELL.

It comes, through the wintry night,
A deep and solid strain,
Like the voice of the distant torrent's might,
Or the moon of the sleepless main;
But wild is the music of wind-woke strings,
In its far and fitful swell,
And swift as the passage of eagle wings,
Is the dying Year's farewell.

It floats o'er the faded fields,
Where the reaper's joy hath been,
With the song of praise which the peasant yields
For the harvests he hath seen;
But the song grows sad on the battle-plain
Of the Brahmin's sun-lit shore,
For it tells of the eyes that look in vain
For the loved that come no more.

It rings through the crowded marts
Of the old world's wealth and power,
And it winds its way to their weary hearts
In the hush of the dreamy hour;
To the young it speaks of their future springs,
With the breezes blithe and bland,
But it tells the aged of better things
In the far unfading land.

And it tells of the deserts crossed,
Of the fair forsaken ground,
Of pleasant streams which the heart hath lost,
And the hidden fountains found;
For it speaks of the rock before us cleft,
When its shadow darkly fell,
And a blessed lesson of hope is left
By the dying Year's farewell.

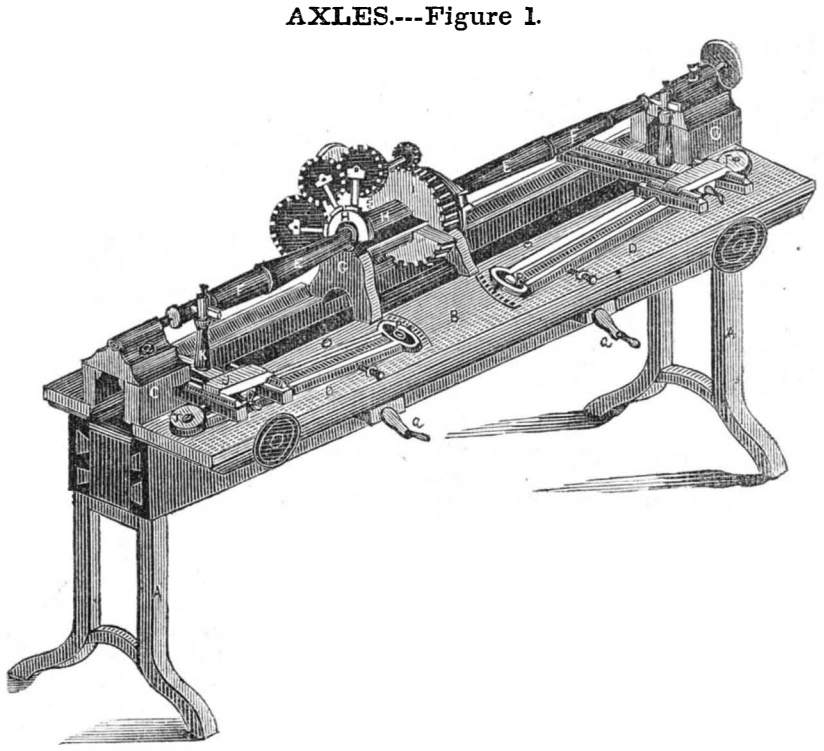
SONG OF THE DIRT.

Dig—dig—dig—
To pierce for the golden ore;
Dig—dig—dig—
Till you sweat at every pore.
Dig—dig—dig—
To root in the deep black sand;
And this is to be a citizen
Of a free and Christain land!
And it's oh! to be a slave
To the Heathen and the Turk,
To rid the hands of the Christian man
From such dirty and toilsome work!

Wash—wash—wash—
Till the back is almost broke;
Wash—wash—wash—
With your legs and your thighs in soak,
Wash—wash—wash—
Revolving an old tin pan,
And wabbling about with a shake and a splash
Till you doubt you're a Christian man!
Soul and body and mind,
Mind and body and soul,
O! can it be right when they're all confined
To the basin and the bowl?

Pile—pile—pile—
When it's only a little heap—
Pile—pile—pile—
Till it gradually grows more deep—
Pile—pile—pile—
And stow it away in a bag,
Till you gaze with eyes of wild surprise
On the contents of that rag!
Oh! can it be here I stand?
And can it be gold I see?
Ho! ho! I am off for a christian land
To spend it so merrily!

IMPROVED COMPOUND SLIDE LATHE FOR TURNING AXLES.---Figure 1.



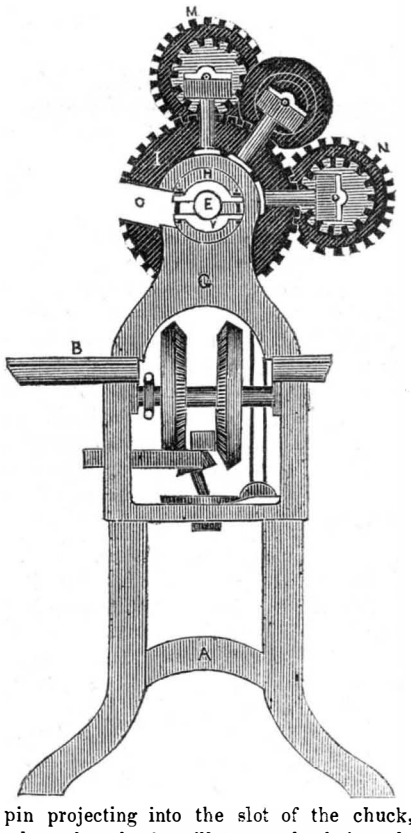
This is a Turning Lathe invented by J. D. White, of Hartford, Connecticut, who has taken measures to secure a patent for his ingenious improvement.

Fig. 1, is a perspective view of the lathe and fig. 2 is a transverse section taken at the left end of the chuck. This invention relates to the turning of axles with two slides and cutters one at each end, but it principally relates to having moveable ways that can move the tool stock to any angle with the revolving axis so as to turn shafts of any taper. By moving the slide parallel with the rotating axis, the cutter will make journals or shafts of equal diameter throughout with equal facility. A, is the frame of the lathe, and B is the table of the common form. C C, are two tail blocks and G two central head stocks to receive the chuck H. E, is the axle to be turned. This axle is placed sideways in the chuck through an opening in the chuck spur wheel I, and the chuck itself, so as to centre the axle in an easy manner. D D, are two moveable ways. J J, are slides of the tool stocks K. The slides move on the rail of the moveable way and are guided by it to cut at any angle. This is done by securing the bottom plate of the moveable way to the end of the table by a vertical axis or pivot T, and securing the way D, at the other end on the table by a set screw —The latter end of the way has a small slot P, in it, so as to let the moveable way be moved out and in at that end to and from the axle to be turned. This is done by a worm screw of which *a a*, are the handles. This screw passes through a vertical bar attached to the bottom of D D, passing through the table; and as this bar has an eye with an interior thread in it, it will be observed that the way at one end will be moved by the slot P, while the other end of the way will only move on its vertical axis. By setting the way in this manner, the tools will cut at the desired angle, which may be indicated by a pointer on the sliding end of the way, and an index on the table.

In turning axles, this compound lathe answers the purpose of two lathes, for the one, cutter can turn the journal at one end while the tool is cutting the taper F, at the other end. The moveable way is a very useful and simple improvement and can be applied to any lathe.

In fig. 2, the opening O, of the spur wheel and chuck is better seen. The chuck is revolved by a spur wheel I, which is fixed around it like a ring. M N, are two spur wheels driven by a smaller spur wheel on the shaft of the pulleys which is between M and N. The use of the two spur wheels to drive I, is for one to be in gear with it while the slot O is passing the other. H, is a coupler which is screwed on to the axle and by a

FIG. 2.



pin projecting into the slot of the chuck, when the chuck will be revolved the axle will thus be revolved with it.

The gearing in fig. 2 seen below G is the double feed gearing to move the slides of the tool stocks in the usual way. This gearing is driven by a band from a pulley above. We have not lettered these for description, as it is a double slide gearing operating in combination the two slides of the tool stocks. This compound lathe has received much commendation especially the simple plan of operating the slides.

Leisure is a very pleasant garment to look at, but it is a very bad one to wear. The ruin of millions may be traced to it.

RAIL ROAD NEWS.

Railroads at the Close of the Year 1848.

The Railroad Journal, summing up the extraordinary influences of railroads upon the country and upon the world, says, it may be safely estimated that the entire expenditure, within the last twenty-five years, in the projection and construction of railroads, will not fall short of one thousand millions of dollars!! and that their influence in facilitating business, in reducing the expense and time of travel, and in opening up new regions of country, has given an increased value to property of twice that amount!!! and yet their influences are only just beginning to be felt. We may add that within a month two hundred and eighty two miles of new railroad will be added to that already in use in this country. The addition is made up as follows: New York and Erie, 127 miles; New York and New Haven, 80 do.; Nashua and Worcester, 45 do.; Harlem, 20 do. Total—282 miles.

Railroad from New York to Boston.

The passenger trains have commenced running on the Railroad from this city New Haven and we hope soon to see the entire chain of Railroads to Boston via the Hartford Railroad managed with a fraternal spirit so as to allow passengers to pass along the whole route without much trouble or delay. There should be two daily trains between this city and Boston and there easily can be. This would be profitable to all the Companies, as there is enough of travel to make two large trains daily—but this is not all, with such facilities and rapid travel, we have no doubt, but the number of passengers would increase in a double ratio, at any rate, during the winter season, no person is going to take the uncomfortable and dangerous passage of the Sound, when he can get a passage by Railroad.

New York and Erie Railroad.

This road was opened last week from Port Jarvis to Binghampton making 200 miles of this road now open from Piermont. This part of the road has been a herculean task to accomplish. Wide rivers have been crossed by costly and permanent stone structures; deep valleys have been raised to the required level; culverts, unexcelled elsewhere on our railroads, have been constructed; high and broad mountains have been "brought low," or pierced by tunnel formed excavations; until the greatest difficulties of this great work are at length overcome.

Vermont Cattle by Railroad to Boston.

The construction of the Vermont Central Railroad has enabled the beef-growers of the Green Mountain State to furnish the Bostonians with their fat cattle without the loss of any of their flesh, or the exposure to dangers, by the long journey on the hoof. A train of 44 cars, laden with them, from the centre of Vermont, arrived at Boston last week.

Break on an Incline.

On the 23d ult. while trains of burden cars were passing up and down the Schuylkill inclined plane of the Columbia Railroad, Pa. the rope broke and the cars rushed down the tracks with tremendous velocity. At the foot of the plane they came in contact with some standing cars, and half a dozen of them were dashed to pieces. The men who were upon the cars on the plane, saved themselves by jumping as soon as they found they were "at loose ends."

The convict labor in the Vermont States Prison has been let, under the authority of an act of the Legislature, to Messrs. Lamson, Goodnow & Co., of Shelburn Falls, Mass., for five years, commencing next May; the manufacture of scythe snaths and cutlery is to be carried on by the contractors.

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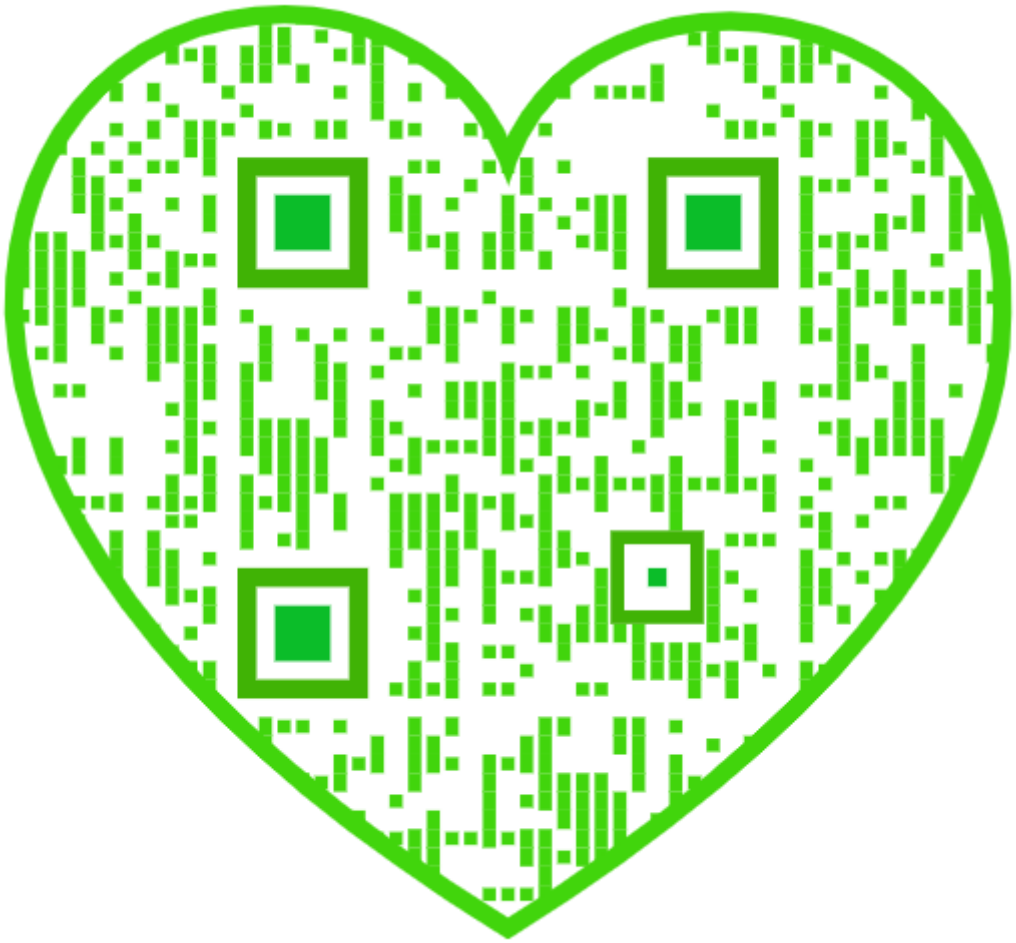

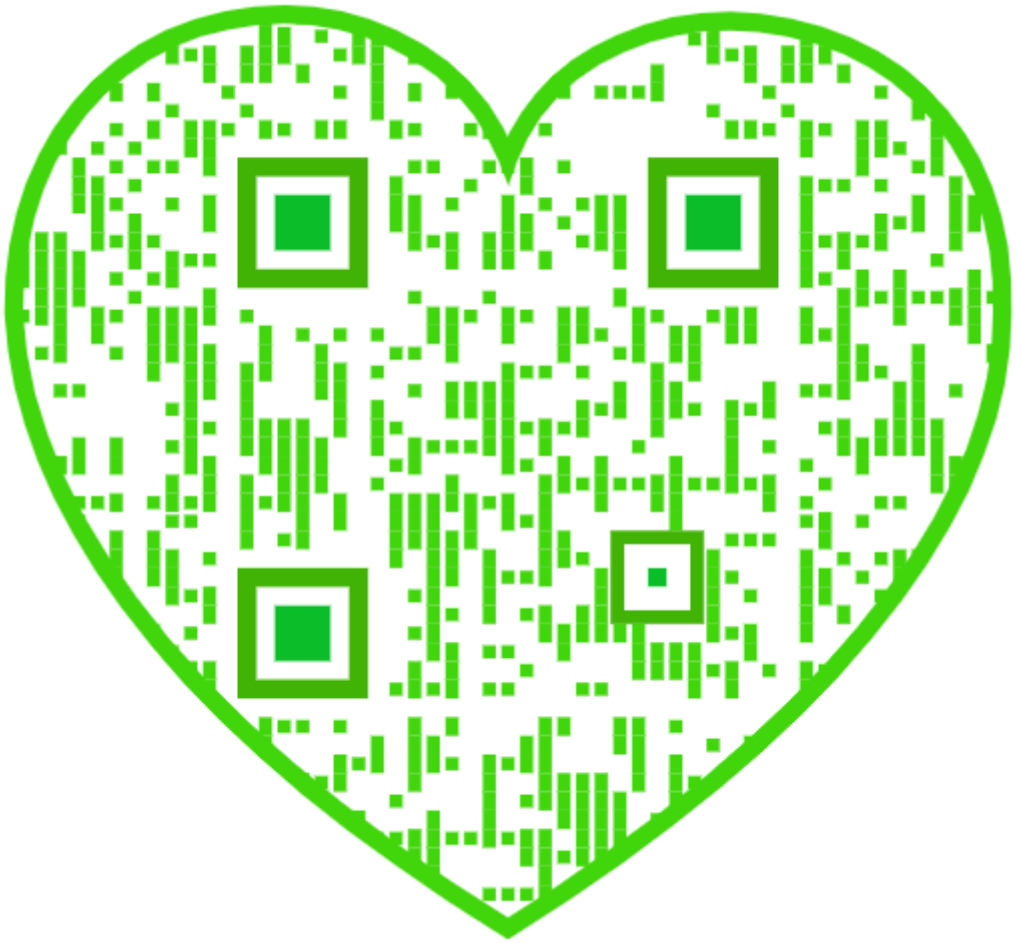

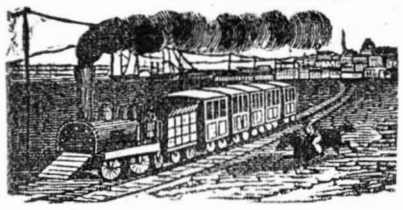

The Scientific American.---Subscribe for a Good Work.

We return our thanks to our numerous subscribers for their favors during the past year. We have received a great accession to our subscription list during "the year just ended." The fame of the Scientific American, is now co-extensive with that of our country. No other work of the same nature has met with the same success—none has been received with more favor by our people. This may be owing to the energy displayed to render at both attractive and useful—to make it (as it is) the mirror of scientific knowledge and the advocate of genius and industry. The age of humbug in these things is past—the people cannot be duped any more with mere "sounding brass and tinkling cimbals." Every thing must now be estimated at its real worth and this is the right way to judge of it. We flatter ourselves that we do much to disseminate real practical knowledge and we have received many tokens acknowledging the benefits received by the information propagated by us Our brethren of the press have been very kind in giving us favorable notices —[illegible]re not ungrateful. It shows that the American Press is always ready to assist in the [illegible]tion of useful knowledge. As this is a good time to commence life anew in the pursuit of knowledge, no investment of capital for 1849 could be more profitably laid out by any person, than by subscribing for the Scientific American.—No man who desires to be acquainted with the progress of science, discoveries in the arts, improvements in machinery and with patent laws and patent business, should be without it, and no man who would have the esteem of being intelligent in these matters can be without it.

Ruins and Treasure in Texas.

About one hundred miles southeast of Santa Fe are some extensive salt lakes or salinas, from which all the salt used in Mexico is procured. Not far from these salinas are the ruins of an old city, which, as is reported, was once large and wealthy, with rich mines, the produce of which was sent annually to Spain. Dr. Wislizenus, in his memoir of a tour through northern Mexico, which was published in the beginning of last year by order of Congress, has the following concerning these ruins :

"At one season when they were making extraordinary preparations for transporting the precious metals, the Indians attacked them ; whereupon the miners buried their treasure worth 50 millions, and left the city together ; but were all killed except two, who went to Mexico, giving the particulars of the affair and soliciting aid to return. But the distance being so great and the Indians so numerous, nobody would advance, and the thing was dropped. One of the two went to New Orleans, then under the dominion of Spain, raised 500 men, and started by way of the Sabine, but was never heard of afterwards. So far the report. Within the last few years, several Americans and Frenchman have visited the place and although they have not found the treasure, certify at least to the existence of an aqueduct about ten miles in length, to the walls still standing of several churches, the sculptures of the Spanish coat of arms, and to many spacious pits supposed to be silver mines. It was no doubt, a Spanish mining town, and it is not unlikely that it was destroyed in a succeessful insurrection of the natives in 1680."

Yankees Locating in Mexico.

Before the war with Mexico, there were seven cotton factories in operation there. Since peace, several machinests from New England have departed for Vera Cruz, with a view of erecting a large establishment. One gentleman has started as the agent for some Boston capitalists, to look up a good location of water privileges for manufacturing purposes.

LITERARY NOTICES.

The American Metropolitan Magazine.

We have received the first number of Mr. Post's new magazine, published at 259 Broadway, and very freely award it the praise of being one of the choicest and most beautiful of its class. The typography and embellishment are tasteful and striking, and the literary matter is exclusively from popular and well known pens. There are nine engravings in the number, and several original articles in prose and verse, from Mrs. Child, Mrs, Embury, Mrs. Stephens, Mrs. Osgood, Mrs. Ellet, Mrs. Campbell, Miss Sedgwick, Miss Gould, Miss Browne, J. T. Headley, C. Edwards Lester, John Brougham, Ralph Hoyt, R. H. Stoddard, G. G. Foster, Nelson Cook and William Landon. The illustrations are by T. H. Matteson. We do not see any thing that ought to interfere with the success of this undertaking, so long as our light periodical literature retains its popularity.

The above notice we copy from the Tribune and are inclined to indorse every word of it.

To those Embarking for the Gold Mines.

We have been favored with the perusal of a little work published by E. N. Kent, practical chemist of this city, giving instruction for collecting, testing, melting and assaying Gold. The instructions which are contained in this work are purely practical and we whould recommend every person to purchase one who is bound for the California Mines. See advertisement on another page.

Messrs. Fowlers and Wells, No. 131 Nassau st. have commenced the monthly publication of the "Water Cure Journal and Herald of Reforms." It will be devoted to the Philosophy and Practice of the Hydropathic System of curing and preventing diseases. Including a correct system of Dietetics, Bathing and the general modes of life. Adapted to the use of families. Terms $1 per year.

We have received a very instructive work, entitled the "Outlines of a New System of Physiognomy." Illustrated by numerous engravings, indicating the signs of the different mental faculties. By Dr. Redfield. The work is well got up and worthy of an extensive sale. Price 25 cents. Published by J. S. Redfield, Clinton Hall, this city.

Russian Minerals.

Professor W. R. Johnson has recently received by order of the Russian government, a splendid and valuable series of the minerals of that country, embracing some rarer varieties of mineral forms, as well as of the rich and valuable metallic ores, from widely distant parts of the empire. The donation is understood to be an acknowledgement of important assistance rendered to certain officers of the Russian Mining Corps sent to this country in 1846, to investigate the subject of the mining and use of anthracite and other coals. It is an appropriate compliment, and was accompanied by letters which speak in the most unequivocal terms of the high estimation of the scientific aid and co-operation of Professor Johnson.

Cost of Mail Service.

The average cost of transporting all the United States mails, taking all the modes together, is not quite six cents per mile. The average cost of transportation in all modes, exclusive of steamboats and railroads, is thirteen and a half cents per mile. The average cost of transportation in steamboats is 6 cents per mile. The average cost of transportation by Railroad is seven and a half cents per mile. The entire length of post routes in operation during the year ending on the 30th June 1848, was 163,208 miles. The aggregate transportation of the mails over these routes during the year was 41,012,579 miles ; and the cost for the year was $2,394,503.

Important Discovery to Ireland.

The English papers inform us that by recent investigations which have been carried on by the Royal Irish Fisheries Company, it has been ascertained that the Newfoundland fishing banks extend eastward across the Atlantic to within 100 miles of the coast of Ireland, and that fish enough can be procured on that coast to supply all the markets in the world.

Oil of Birch Bark.

The Russians obtain this oil by filling a large earthern pot, with the thin whitish paper-like external bark of the birch tree, carefully separated from the coarse bark, closing the mouth of this pot with a wooden bung, pierced with several holes ; and then turning it over and luting it with clay to the mouth of another of the same size. A hole being dug in the ground, the empty pot is buried in it, and a fire is lighted round and over the pot containing the bark, which is continued for some hours, according to the size of the pot.—When the apparatus is cooled and unluted, the lower pot contains the brown oil, mixed with pyroligneous tar, and swiming on an acid liquid.

In some places iron pots are used for this purpose, and the bark is hindered from falling to the lower pot by a plate of iron, pierced with holes ; 1000 pounds of bark yield about 60 of oil.

The waste of fuel in this process may be avoided by placing the pots in the side chamber of a reverberatory furnace filling the chamber a little above the joining of the pots with sand, and then proceeding to distillation.

The oil is used in Russia for currying leather, to which it gives a peculiar odor, and a power of resisting moisture, far beyond any other dressing. Its use seems to have arisen from observing that the thin paper-like leaves of birch bark, remained after the coarser of the bark, and the timber of fallen trees had rotted. The oil appears to owe this quality to a resin which by this mode of distilling is allowed to escape in a great measure from the action of the fire, and drop into the lower pot.

Other barks, as those of the oak, willow, poplar, alder, as also poplar buds, rue and savine, have been tried, but the produce from them was only a stinking oil. Birch wood yields only a stinking oil totally unlike the oil of the external bark. Cork yields an oil in some degree approaching that of birch bark.

To Make Lasts the Shape of the Foot.

First, take a couple of pairs of stockings that will fit the feet rather snugly. Put one pair of them on. Then moisten the other pair with oil, and put them on over the first. Then prepare a mixture of calcined plaster of Paris and water in the manner that is done for taking plaster casts. Having coated over a board with a layer of this of suitable thickness, stand upon it with the foot, and let some one apply successive layers of the plaster over your whole foot, say a quarter of an inch thick. When this has hardened, carefully cleave it off, and then by cementing the pieces together again by the glue or the same preparation of plaster that you have used, you will obtain a mould of your foot. Oil the inside of this, and pour in a sufficient quantity of prepared plaster to fill it. After this has hardened it may be taken out, and you have a castting of your foot, a perfect *fac simile*, only as much larger as the thickness of the outer pair of stockings that you had on. By putting this into a last turning machine you may have a wooden last turned exactly like it, and a boot made upon it will fit the foot perfectly.

Vegetarian Society.

There is a society in existence in England under this title, the members of which abstain from eating meat and drinking intoxicating beverages. The annual meeting was celebrated a short time since by a public dinner at Manchester, to which 232 persons sat down many of whom had abstained from animal food for periods varying from 20 to 40 years. The following is a list of courses served up : First course—Large savory omelet, rice fritters, beet root, onion and sage fritters, savory pie, mushroom pie, bread and parsely fritters, force-meat fritters, large maccaroni omelet—water the only beverage. Second course—Plum pudding, moulded rice, almonds and raisins, cheese cakes, figs, custards, grapes, flummery, sponge cakes' goose-berries, nuts, red and white currants, moulded sage, fruit tarts—water the sole beverage.

Give a man the secure possession of a bleak rock, says a forcible English writer, and he will turn it into a garden ; give him a nine years lease of a garden, and he will convert it into a desert.

A Nubian Loom.

Miss Martineau, in her "Eastern Life," says : —Early one morning, when walking ashore, I came upon a loom which would excite the astonishmant of my former fellow-townsmen, the Norwich weavers. A little pit was dug in the earth, under a palm,—a pit just big enough to hold the treddles and the feet of the weaver, who sits on the end of the pit. The beam was made of a slender palm stem fixed into two blocks. The shuttle was, I think, a forked twig. The cotton yarn was even, and the fabric good,—that is, evenly woven. It was, though coarse, so thin, that one might see the light through it ; but that was intended and only appropriate to the climate. I might have wondered at such a fabric proceeding from such an apparatus, if I had not remembered the muslins in India, produced in looms as rude as it. It appears, too, from the paintings in the tombs, that the old Egyptian looms were of nearly as simple a construction, though the people were celebrated for their exports of fine linen and woolen stuffs. The stout-looking, gaily checkered sails of the boats, and the diversified dresses of the people, represented in the tombs, were, no doubt, the produce of the rude looms painted up beside them. The baskets made by the Nubians are strong and good. Their mats are neat, bnt neither so serviceable nor so pretty as those of India ; but then this people have not so much material as the Hindoos. The rope-making is a pretty sight, prettier even than an English rope-walk though that is a treat to the eye. We often saw men thus employed, one end of their strands being tied to the top of a tall palm, while they stood at the other, throwing the strands around till they would twist no more.

Awful Death.

We learn from the Lowell Courier that on Saturday last, at the machine shop of Messrs. Aldrich, Tyng & Co. Mr. Joseph White, who was employed by them as an engineer, came to his death in the following manner :—At the close of work he went to blow off the boiler, in doing which he stood in such a position by the boiler that when he let off steam it struck him directly in the breast, by which he was knocked down, and instantly enveloped in steam and boiling water. He arose and walked a few steps, then fell upon the floor, and exclaimed, "I am scalded to death." He survived but a few hours.

A person should be very careful how he turns a steam cock. He should on no account stand before it. We had a lesson of a severe scald by a careless act of this kind, which will not soon be forgotten.

Silver Mine in Norway.

In the Swedish official paper, of October 27, it is stated that, on the 14th of September, the workmen employed in the King's mine, which is one of the Konigsberg silver mines, in Norway, found a lump of pure native silweighing 208 pounds, and that, on the 6th of October, another lump of native silver, equally pure in quality, of no less weight than 436 pounds, was dug out of the same mine. It is a fact worthy of being recorded, that about twenty years ago this mine was offered for sale, in London, for the sum of $10,000; but the capitalists of that day had not sufficient confidence in the treasures it was presented to possess to give this comparitively small price.

Wool in Canada.

The farmers of Upper Canada grow a large quantity of wool. Under the present law, the wool can come into this country to be manufactured, and be returned in cloth without duty. A woolen factory has been built at Oswego for the Canadian business. The Yankees are now traversing Canada, soliciting the business. The wool is bagged, shipped to Oswego, and in a few days the cloth returned.

Ærial Voyage to the Gold Regions.

Professor Syntax Profound is organizing a company to go to the gold regions by an air line from this city to the Gap of *Gorten* in the Rocky mountains. The books for passengers in the balloon will be opened in a few days. The gas is already generated, and all that is wanting is simply a few of the *rocks* as ballast, as the gas is exceedingly buoyant.

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For the Scientific American.

The Telegraph.

GENTLEMEN.—In your editorial columns under the date of the 16th inst., you have the following remarks in relation to the action of the Patent Office with reference to the application of Alexander Bain for a patent for an improvement in the Telegraph, viz:

"Our readers will perceive among our weekly list of patents, one granted to Mr. Bain for his Electro-Chemical Telegraph. It is an American patent for one granted in England in 1843. Mr. Bain applied for a patent on his improved Telegraph, patented in 1846, which was contested by Professor Morse and decided against the former by the Commissioner. *It was our opinion all along* that Mr. Bain should have received a patent for his improved apparatus, *as he had undoubtedly a right to it*, and paying $500 for it he wished to secure the one that extended to 1860. Instead, however, of being able to do this, he had to deposit a second $500 and accept a patent (to protect his rights) which will expire in 1857."

(1.) As you have given it as your opinion that Mr. Bain "had undoubtedly the best right" to the improvements in the Telegraph claimed both by him and Professor Morse, and thus impugn the decision of the Commissioner of Patents in that matter, do you not owe it as well to that office as to the public, to state the *facts* on which you base your opinion? In view of the fact that the public papers are now teeming with misrepresentations, I do not say intentional,—in relation to the controversies going on between the several competitors in telegraphic invention, and particularly with regard to the action of the Patent Office, you, professing to be the organ of inventors, and the advocate of the just claims of all of them, and by interest at least, bound to sustain the Patent Office when its action is right. Under such circumstances I say, you ought to state the grounds of your opinions when you thus summarily reverse the decision of the Commissioner of Patents and decide against the rights of the American Inventor, by whose efforts telegraphing was first introduced into this country, and in favor of the claims of a foreigner who has done nothing to entitle him to anything more than simple justice—certainly not to our particular gratitude and regard.

(2.) As I know something of the matter, with your permission, I will for the benefit of your readers, state the circumstances under which, I understood, the Commissioner of Patents decided against the claims of Mr. Bain, based upon his English patent of 1846, and in favor of Mr. Morse. The facts are these: In January, 1847, Professor Morse filed in the Patent Office a caveat setting forth the precise invention claimed by Mr. Bain and patented in England in 1846-7—the English patent being sealed in December 1846, and the specification enrolled in June 1847. In January 1848, Professor Morse filed an application for a patent for the same invention, which he had deposited in the secret archives, as he had a right to do. Early in the summer of 1848, Mr. Bain applied to the Patent Office for a patent for his alleged invention. Of course, these applications came in conflict, and an interference was declared by the Commissioner between the two conflicting claims.

(3.) Thus you see the Commissioner decided that Bain's improvement *was patentable* and of course, Morse's was, it being for the same thing. And the only remaining question for the Commissioner to decide was, *which of the claimants of the invention was the first inventor*? The proof on the part of Mr. Morse carried his invention back to the time of the burning of Niblo's Saloon, in November 1846. His caveat filed in January 1847, was irrefragable proof of the invention by him at that time. When Mr. Bain was apprised of the interference, he intended to rely upon his patent of 1846-7, and other proof prior to its date. But the question whether or not he could go behind the date of his English patent for proof of priority was raised, and with the consent of both parties, submitted by the Commissioner to the Attorney General of the United States, who, in a clear and luminous opinion, decided that he could not. Another question also arose which was, whether the date of the enrollment of the specification, which was the *completion* of the patent in England, was not the true date of the patent? That question was decided by the Commissioner, under the previons decision of the Attorney General, in the affirmative, it being clear to his mind that the word "patented" in our law means the *completion* of the patent. But the Commissioner relied upon the well known general principle of law which makes the true date of a legal instrument, the day on which it is *delivered*, not the actual day in the instrument. That decision limited the date of Mr. Bain's proof, in the event of his relying upon the patent of 1846-7 to June 1847, five months subsequent to Morse's caveat, and seven months subsequent to his parol proof.

(4.) But when Mr. Bain returned to this country, to contest Morse's claim, he informed the Commissioner that he should rely for proof of the priority of his invention, upon his patent of 1843. That patent, was therefore, carefully examined, and it *was found not to cover the invention claimed by him under the patent of* 1846. It was for a very different thing, viz: copying surfaces by means of the electric current and chemically prepared paper. It was the dispensing with the local current and the cumbrous machinery, which constituted the invention. As Mr. Bain's patent of 1843 *did not* set forth, nor claim the invention, priority had of course to be decided in favor of Morse, or the law and the testimony must both have been disregarded by the Commissioner.

(5.) To what other conclusion could the Commissioner arrive upon the state of facts before him? If you have any other reasons why the decision should have been in favor of Mr. Bain, your readers, myself among the number, would be obliged to you if you would give them to the public. But, at the same time, will you not enlighten your readers on this point? *Why did Mr. Bain get a patent in England in* 1846-7, *for an invention which he claims in this country to have fully secured in his patent granted in England in* 1843? And why, in 1846-7, did he make an oath or declaration in England, as the law there requires, that his invention was *new, and never before known*, if he had actually invented and got it patented in 1843? Your readers would be glad to have you explain these inconsistencies in Mr. Bain's conduct.

(6) It is true that a patent has been granted to him for one of the several inventions set forth in his patent of 1843. *It is a different thing* from his invention patented in 1846-7 which he now claims to be the same, and it is an invention which Morse *does not* claim, nor approve. It is for copying surfaces as before stated, by the electric current, chemically prepared paper, slow and cumbrous machinery, and even the use of the magnet, and, it is believed, will never be available in practice for telegraphic purposes.

(7.) In conclusion, permit me to say, that I am confident, after you shall have acquainted yourselves with the facts of the case, you will notwithstanding the summary opinion which you have expressed in behalf of Mr. Bain, become satisfied that justice has been done to Mr. Bain, and that the action of the Commissioner of Patents upon his application has been correct. FAIR PLAY.

P. S. As you profess to be acquainted with science and the progress of the arts, it is not necessary to remark for your benefit, although it may be for the information of some of your readers, that, long before the date of Mr. Bain's patent of 1843, letters or signs had been made on chemically prepared paper by means of the electric current. Therefore, not their *use*, but the *new methods* by which they are used, are now patentable.

We will answer the postscript first. Any of our readers who have paid attention to the articles published in our columns recently on the *Telegraph*, will find it plainly stated that Mr. Bain does not claim to be the *first* who made telegraph marks on chemically prepared paper.

(1.) We will give our views at the end of the chapter why we consider Mr. Bain entitled to the patent now in controversy. As for the *misrepresentations with which the papers* have been teeming, the friends of Prof. Morse and Mr. Bain have gained for themselves much acrimonial distinction—we are not able to decide which of the parties are entitled to the jack knife. When we consider the action of the Patent Office right—no political chicanery would induce *us* to say it was wrong, our whole course of conduct is a living evidence of this fact; but if from information in our possession, our faith leads us to think different from the decision of the Patent Office, then we as freely and frankly express our opinions. The just claims of the inventor are the objects of our advocacy and defence, be that inventor a Professor Morse, or a stranger Mechanic without friends or fortune like Mr. Bain. In a question of justice we never ask what a man has done heretofore, not where he comes from, but "has he justice on his side?" In this light, we have made up our minds respecting the claims of the inventors spoken of. It is very evident however, that "Fair Play" in viewing the claims of each, has not instituted an *examen*, but weighed them with a false balance. He took all the previous inventions of Prof. Morse and threw them into the one scale, and then leaped in himself with his prejudice against the foreigner and down came Mr. Morse's scale tossing Mr. Bain to *gingle di cootch*, if he could be thrown so far.

Before the Commissioner makes a decision he no doubt asks the council of his Examiners—they are his ministry. It cannot be expected that he can minutely examine into every specification. This is the duty of the examiners—they are there for that purpose. In a letter which Mr, Page addressed to the Tribune of this city, he used the very epithetical terms which Fair Play does in reference to Mr. Bain. We were sorry to see such prejudice exhibited, but as he is an old friend of Prof. Morse, much may be allowed for a friendly feeling towards that gentleman. But every man of a polite education should use the term *foreigner* with great discrimination. It may mean a *Feejee Islander*, or it may mean a polished son of France. Fair Play uses it epithetically and so did Mr. Page. Mr. Bain is a Scotchman, a practical mechanic—a Clock-maker by occupation and therefore a cousin in craft to our Yankee friends. As far as it relates to the land of his birth, we presume that he had no choice of that when he was born. If we used an epithetical term towards him respecting his country, we would be afraid that the gifted Prof. Henry, would accuse us for throwing stones at his father's grave. All the world is bound by some tie of gratitude to Mr. Bain. Why he is the inventor of the Electric Clock, the Railway Signal Telegraph and the Printing Telegraph, and these are public property to our citizens. His Electric clock and his Signal Telegraph, will yet be used by all our railways, and will be found to be nearly of as great benefit to our country yet, as the marking telegraph. As it respects his Printing Telegraph, he made a present of that to the world. Fair Play may say, that it is a poor invention." Prof. Morse called it "the most ingenious printing telegraph yet published" this was in January 1847, intended we suppose as a special compliment to his countryman, the ingenious Royal E. House.

(2.) As Fair Play states that "Mr. Morse filed a caveat in 1847, setting forth the precise invention claimed by Mr. Bain," will he be so good as to inform us why Mr. Morse was so mysteriously silent about it in his letter to the Philadelphia Ledger of January 8, 1847. In that letter he states that he was then "taking measures to secure by patent some recent modifications simplifying his telegraphic alphabet." Not a word about a chemical telegraph in it from beginning to end. We presume that his chemical telegraph caveat stated that he had not then completed his invention.

(3.) We have carefully read the opinion of the Attorney General, and we consider it no legal decision for the Commissioner to make the new Rule to suit the new case. It has been the rule of the Patent Office heretofore to date the American with the English patent, why was it altered in this case? In legal conflictions, where the law is not plain, custom rules, but if the custom is wrong, it is the practice to remedy it by a law before another conflicting case is acted upon. It would have looked better in the eyes of the people had this course been pursued in this case by the Patent Office. If the word "patented" in our law, means the enrolment of the English patent—does not the *application* for a *patent*, not the caveat, mean the *completion* of the patent also. Mr. Bain's patent was enrolled June 12, 1847, Mr. Morse's January 1848. On the 19th June 1847, Mr. Bain's specification with drawings was published to the world and was sent from London to the Scientific American one month after—and about 7 months before Mr. Morse made application for a patent. Where then lies the direct and presumptive evidence of priority of invention?

(4.) The reason why Mr. Bain when he returned to this country changed the mode of contesting Prof. Morse's claim, is explained in our paragraph quoted by Fair Play. The decision of the commissioner forced him to do this. We ask Fair Play if he has not overshot the mark in stating that Mr. Bain's Patent of 1843 and his patent of 1846 does not both embrace the copying of surfaces. Mr. Bain's specification of 1847 states that it is for improvements on his invention of 1843, it also mentions the local current to move the paper by a magnet. The dispensing with a magnet and local current then, is the grand point of confliction between Prof. Morse and Mr. Bain. Well be it so as Fair Play *knows*.

(5.) As for Mr. Bain's declaration, of "new and never before known," he and Fair Play have different views upon the point of confliction.

(6.) Mr. Bain claims as the basis of confliction—the using of a single circuit to copy surfaces on chemically prepared paper. Fair Play says that the basis of confliction is the dispensing with the local current to move the paper by a magnet. Let the two explain the difference, we come to stronger ground for the opinions we have previously advanced.

(7.) We have acquainted ourselves with one fact relating to this case, which Fair Play is *apparently* ignorant of, viz. that if a Patent were granted to Professor Morse to-morrow, it would become void within 24 hours afterwards in the eye of the law. Now we like to see patents granted that will stand the test of legal scrutiny—this gives dignity to the Patent Office. Fair Play states that Prof. Morse had evidence of inventing his Electric Telegraph which reached back as far as October 1846. But we have evidence of an Electro Chemical Telegraph invented in February 1846, which used no local circuit nor magnet. This chemical telegraph was tested and made with a single circuit marks on small strips of cloth prepared with the prussiate of potash, through an iron fence 1000 feet long. A description of this telegraph was read before the Royal Scottish Society of Arts in Feb. 1846, and published in May of the same year with a drawing. This was eight months before Prof. Morse filed his caveat, and yet Mr. Bain was granted a patent in England after this—the Patent Office there not considering it a confliction with his claims while our Patent Office considers Mr. Bain's claims to conflict with those of Prof. Morse. If Mr. Bain does not receive a patent, the end of this controversy will be, that an electro chemical telegraph, simple and effectual will soon become the public property of the whole people of the United States. The description and drawing is now in our possession published 8 months before Prof. Morse filed his caveat, and sent to the Editor of the Scientific American as a present with some scientific works from a respectable foreign mechanic. We could say a great deal more on this subject to clear it up but our space forbids us to do so at present. What we know of Mr. Bain is derived from public documents; with the exception of seeing him five times for a few minutes each time, while he was describing some of his inventions. He is a mechanic possessing a head, the inventive powers of which cannot be limited, and he has hands that can execute what his head can conceive in Machinery. Even in the midst of all this controversy, he has invented a most beautiful improvemont on his machine which is to be used on various lines. He is a man we believe that it would be for

(*Continued on page* 126,)

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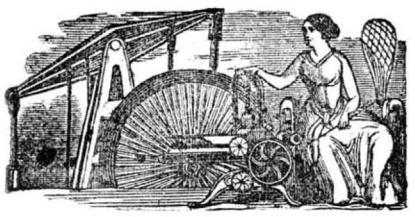


New Inventions.

Improved Railroad Switch.

It is well known that the common *frog* or *branch plate* now in use on most Railroads is considered to be the cause of much damage to the wheels and machinery of the engine and cars. To remedy this evil some railroad companies between Albany and Buffalo have substituted what is called the *frog* latch for the *frog* plate. This does very well but it is attended with much delay to the trains as the latch is moved by the same process as the switch, hence there has to be two parts and levers varying from 36 to 80 feet apart, which have to be changed in order to pass a train by one branch.

We have been informed that Mr. Carlton Dutton, a most excellent mechanic at the Auburn and Rochester Railroad Machine Shop (an establishment by the way which is prolific in inventive genius and skill, from the Superintendent Isaac Van Kuren, Esq. to every mechanic about it,) has recently invented a plan to change both the switch and latch by a very simple arrangement of one lever—which beside being more effective than the old plan, is also provided at much less expense than by using the *plate* and guard rails.

One of them has been placed on the Auburn and Rochester Railroad and has been justly admired for its simplicity and durable qualities. It has been recommended to us by the Superintendent who considers it to be one of the best inventions which has been introduced for a long time on Railroads.

Improved Washing Machine.

Messrs. Case and Graves of Granville, Ohio, have invented a very beautiful improvement on a Washing machine, something which everybody thinks is now obsolete, but nevertheless it is a good improvement and one which has been highly admired by all those who have seen and used it. The washing machine contains, it may be said, two boxes for the clothes completely separated from one another, yet the clothes rubbed in them both by a dasher, which has a reciprocating motion like the fulling stocks. One motion of the dasher operates the clothes in one box and the return motion operates the clothes in the other box or tub. The dasher is suspended above the middle of the machine and hangs down fitting accurately in the long wash tub or box. The bottom of the tub is concave and the bottom of the dasher convex, so as to move tight in the box according to the vibrating stroke of the dasher. A rotary motion drives the dasher, thereby rendering it very easily operated. One of Ira Avery's Wringing machines along with this should be found in every house, that has heavy washing.

Improved Railroad Car Wheel.

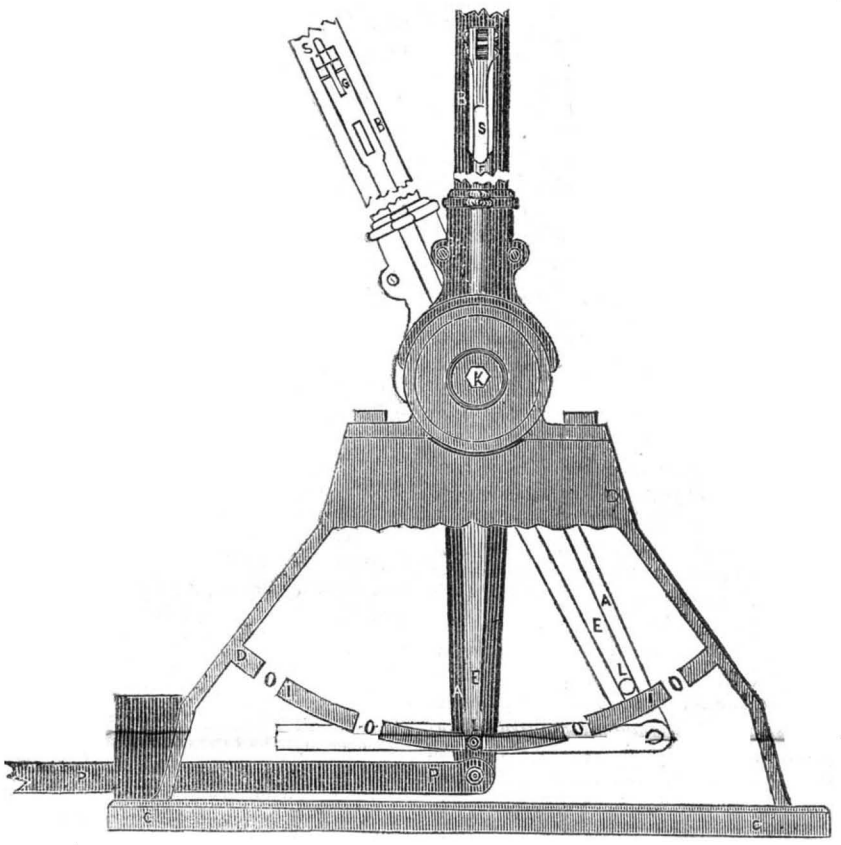
Mr. Isaac Van Kuren, chief engineer of the Auburn and Rochester Railroad, N. Y. has made a very beautiful improvement in the construction of car wheels. It consists in casting the leaves of the wheels with an elliptical interior, which has been found to give far greater strength to the wheel according to the quantity of metal than is found to be embraced in the old cracker wheel. As it regards the different forms of wheels and other mechanical contrivances, such as tubes, &c. much has yet to be learned, because the subject has not yet been fully investigated. The experiments of Fairbairn with the tubular bridge resulted in favor of a square in preference to a circular tube, which before was considered to be the best form for strength. Mr. Van Kuren in his wheel, has, in our opinion, adopted the best form for a moving body, and practically considered, it has demonstrated this fact conclusively. They are now being extensively manufactured in Rochester, and measures have been taken to secure a patent.

Telegraphic Pen.

The Charleston Courier says that a gentleman in that city has invented an instrument which will "amazingly improve the facility of Telegraphic Communication. The important improvement is that the metalic pen which now records the message is so arranged as to operate directly on the key of the next office, and so on in connection from one end of the line to the other, where it operates on the pen which records the message. To illustrate—the operator at Washington desires to send a message to New Orleans. He proceeds to write, and the pen at Petersburg plays the part of the operator by striking the key, which sends on the letter or word written with a renewal of the magnetic fluid created by their battery, to Charleston, where the same process is repeated to Columbus, and from thence to New Orleans, where it is recorded. By this means the communication is instantanious, the first tick of the operator sending the mysterious agent directly to the desired point. In this case all re-writing, copying or delay, will be avoided—while at the same time any office can obtain a copy of the present message. If this instrument performs what it is expected to do, instant intercourse may be had to any distance that the wires may be extended."

All this is accomplished by House's Telegraph. The messages by it are printed as plain as A B C—no copying nor rewriting required.—Ed.

WOODWARD'S PATENT SWITCH STAND FOR RAILROADS.



This is a Switch Stand invented by F. G. Woodward, and they are now manufactured by Mr. B. H. Goodale of Worcester, Mass.—They have been highly approved by eminent engineers. This is a side view and semi-section, and shows that it is of the vertical lever kind.

The engraving shows a stand for five tracks. A B, is a hand lever with fulcrum K. P P, is a rod connected with the switch rails. E F, is the latch rod, the office of which is to disengage the pin L, from the notches O, when the switch is to be shifted. S, is a lever handle to facilitate the last mentioned operation. G, is a padlock hole. The elevation of the stand will convey a correct idea of the apparatus, and the dotted lines exhibit its operation, so that all those acquainted with the business will understand it at once.

These Switch Stands present an important improvements, and can be made for any number of tracks. More information may be obtained by communicating with the manufacturer, Mr. Goodale.

Sleeping on the Railroads.

A mechanic in Philadelphia has invented a new kind of Napper, which is to be the accompaniment of every traveller. The object of it is to enable a traveller in a railway car or stage coach, or in any conveyance, to enjoy at will a comfortable sleep or nap, without requiring any more space, or incommoding a neighbor. He can carry his bed in his pocket till wanted, and all he requires is a hook above his seat, which can be easily furnished. This is a good invention, although it puts us in mind of the old yankee preacher, who in kindly admonishing his hearers respecting a snoozing propensity, told them in his quiet, sly way, that "all those who intended to sleep next Sunday should bring their night caps to keep their heads warm."

Inlaid Marbles.

A beautiful mode of ornamenting marbles has recently been brought into use in Paris: It consists in etching by acids, deeply into the the marble, various designs upon a properly prepared bituminous ground. When the corrosion has gone sufficiently deep, the cavities are filled up with hard coloured wax, prepared so as to take a polish equal to that of the marble when cleared off. Drawings thus made on black marble and filled in with scarlet wax, after the manner of Etruscan, and certain Egyptian designs, are said to have a very noble effect, and are applied to tables, panelling, stoves, &c., &c.

New Motive Power.

The Boston Post says that two young Pennsylvanians, now in Boston, have invented a locomotive by which a vehicle is propelled at the rate of 200 or 300 miles per hour. Ice and snow are no impediments to its operation. The Post says, it is precluded from revealing the method, and declares the inventors are not visionaries but the authors of at least one very useful invention.

It professes to travel two hundred miles too quick to be generally credited.

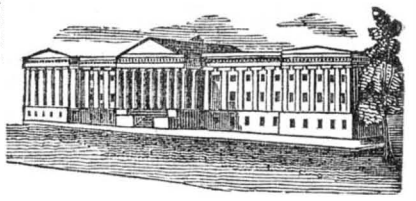
Architectural Ornaments.

Messrs. Boyden and Joy, of Worcester, Mass., have employed for carved capitals, mouldings, and other ornamental work, beautiful castings of Potter's clay. These can be made of all colors and every pattern, and for outside work, are as durable as stone while in point of economy the saving must be 60 or 70 per cent.

Drain Pipes.

Pipes for underdraining are made by Mr. Price of Middletown Point, Monmouth county, New Jersey. They are made of burnt clay and many of the farmers in the southern states are availing themselves of their benefits in draining.

A pulley of one serial groove upon a truncated cone, as the fusee of a watch, is calculated to maintain a constant equilibrium or relation between two powers, the relative forces of which are continually changing.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending Dec. 19, 1848.

To J. G. Day, of Brooklyn, N. Y., for Bell Telegraph. Patented Dec. 19, 1848.

To John H. Hecker, of Hinkelstown, Pa., for improvement in apparatus for Drawing and Measuring Liquors. Patented Dec. 19, 1848.

To Reuben Smith, assignee of Samuel Maxam, of Westfield, Mass., for improvement in Furnaces for Heating Sad Irons. Patented Dec. 19, 1848.

To P. Pengeot and G. Pengeot, of Buffalo, N. Y. (name of machine not stated,) Patented Dec. 19, 1848.

To Neri Blatchly, of Windsor, N. Y., for improvement in Ploughs. Patented Dec. 19, 1848.

To S. Taylor and A. R. Davis, of East Cambridge, Mass. for improvement in machinery for Boring Brush Blocks. Patented Dec. 19, 1848.

To W. H. Bustin, of Watertown, Mass. for improvement in Horse Collars. Patented Dec. 19, 1848.

To Ira Glynn, of Syracuse, N. Y. for improved Sash Bearer and Fastener Patented Dec. 19, 1848.

To Joseph P. Pirsson, of New York City, for method of employing water used for condensing steam as a motive power. Patented Dec. 19, 1848.

To Ebenezer Rowe, of Rockport, Mass. for improvement in the manufacture of Ichthyocolla. Patented Dec. 19, 1848.

To D. M. Smith, of Springfield, Vt. for method of preserving the shape of steel springs in the process of tempering. Patented Dec. 19, 1848.

To Allen Goodman, of Dana, Mass. for improvement in machinery for turning irregular shapes. Patented Dec. 19, 1848.

DESIGNS.

To Samuel D. Vose, of Albany, for Design for Parlor Stoves Patented Dec. 19, 1848.—Ante-dated June 19, 1848.

For the week ending Dec. 26, 1848.

To David B. Haight, of Perryville, N. Y., for improvement in Ploughs. Patented Dec. 26, 1848.

To Waldron Beach, of Baltimore, Md for Improvement in Corn Shellers. Patented Dec. 26, 1848.

To H. D. Bartleit, of Harmony, Me. for improvement in Lathes for turning Hoe Handles, &c. Patented Dec. 26, 1848.

To Robert T. Fry, of Spring Garden, Pa. for an oblique Door Latch. Patented Dec. 19, 1848.

To Peter H. Low, of Boston, Mass. for improvement in Piano Forte Action. Patented Dec. 26, 1848.

To William Grant, of Boston, Mass. for improvement in Bolt-heading Machines. Patented Dec. 26, 1848.

To L. A. Orcut, of Albany, N. Y. for improvement in Cooking Stoves. Patented Dec. 26, 1848.

To T. J. Lovegroove, of Baltimore, Md. for method of employing centrifugal force in the casting of Iron Pipe. Patented Dec. 26, 1848.

To Thomas Green, of Dewitt, N. Y. for improvement in Sawing Spokes. Patented Dec. 25, 1848.

To John J. Wise of Baltimore, Md. for improvement in Piano Forte Action. Patented Dec. 26, 1848.

To H. Parker, of York, Pa. for improvement in Stoves. Patented Dec. 26, 1848.

To Otis D. Ballou, administrator of Albert G. Bartlett, of Oxford, Ohio, for improvement in Grain Drills. Patented Dec. 26, 1848.

RE-ISSUE.

To T. D. Jackson and A. Judson, of New York City, for Bell Telegraph. Patented Oct. 17, 1846. Re-issued Dec. 26, 1848.

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NEW YORK, JANUARY 6, 1849.

A Retrospective Glance.

The year 1848 has closed and it will never return. Its days, weeks and months are now with the eternity of the past. But although its three hundred and sixty-five days will no more come back again, yet the events which have transpired during that period are still with us—they are not wrapped in oblivion, but like dim *talbotypes* they are painted on the mind with the pencil of memory, and but await a touch from the photographist "*remembrance*" to pass in panoramic review before our mental vision.

Since the first of January 1848, the civilized world has been startled by strange and wonderful convulsions. The land of the Gaul has dashed to pieces the crown of her Citizen King and the banner of a free Republic floats now from the battlements of the Palais Royal. In other countries despotism has ruled with a high hand and freedom has been crushed by the iron hand of power—but the end of these things is not yet.

During the past year, the boundaries of science have been extended and many new facts stored up in her treasury. Chemistry, that old and yet youngest of all the sciences, has added some new and important discoveries.—Chloroform and the Electric Light are both interesting discoveries, but especially the latter. Whatever may be its practical results, time alone will tell; we only hope that for purposes of general illumination it will prove itself to be as superior to gas, as gas is to candles, but we are afraid that its economical advantages have been exaggerated.

Astronomy has poured some of her treasures around the footsteps of American female genius, in the discovery made by Miss Mitchell, who has received distinguished tokens of admiration from eminent men of many nations.

In Steam Navigation, the distance between this city and Liverpool has been shortened by new and improved steamships nearly one fourth of the time previously occupied in the passage. Some valuable facts have recently been added to the science of marine propulsion, by Thomas Ewbanks of this city, whose experiments we shall notice more at length at some other time. It has been announced that a celebrated French engineer has discovered a new mode of increasing the expansive power of steam tenfold, and yet controlling it with as much ease as under a low pressure.—Time will prove the correctness of these statements—statements made to us with positive assurances of success, but which are very much opposed to our philosophy. It has been hinted in some of our foreign exchanges that Professor Faraday has discovered a new power as superior to steam in the propulsion of machinery as steam is to animal power.

A great number of new machines for different purposes have been invented and many valuable improvements added to to the old.—A greater variety of these are to be found in the Scientific American than in any other paper or magazine whatever. Any one of our readers will be convinced of this, by taking *a retrospective glance* through their back numbers. Every man should do this sometimes.

It is not possible for us to notice now all the inventions which we have introduced to the public though our columns during the past year—we can but skim along the broad expanse and dip our *wing* here and there into its bosom. We therefore leave this subject at present with a hope that our many readers have enjoyed "a happy new year," and that during 1849 our inventors and men of science will make new discoveries in science and art, which will be of more benefit to our country than the golden sands of California and which will confer honors upon them and our common country, that will shine with undiminished lustre when "the most fine gold becomes dim."

Postage Reform.

The following are the reforms proposed to be made by the Post Office Reform Association in this city:—

1. A uniform rate of Two Cents postage on letters weighing half an ounce, and two cents for every additional half ounce, prepaid, and double that rate if not prepaid.

2. Newspapers, periodicals, and all printed matter, one cent per sheet; but newspapers of the smaller size half a cent., to be prepaid, except newspapers and periodicals sent from the office of publication.

3 To reduce the postage on letters and newspapers by mail packets and steamers, to a rate which will bring it within the means of every class of citizens to maintain frequent intercourse with their friends in other countries, without feeling the postage to be a burdensome tax.

4. To adopt measures that in all large towns and cities there shall be a free delivery of letters and newspapers, and also for the reception and conveyance of letters to the post office for the mails free of any expense.

5. To abolish the franking privilege entirely, that postage may be paid on every thing sent by the mails. Postage of members of Congress to be paid as their other expenses, and postmasters to be remunerated for the loss of the franking privilege and the temporary diminution of their income, by an increase of their commissions.

We hope that all our cities and vilages will adopt measures to carry out this great and beneficial reform.

The Post Office letter delivery has been radically reformed in this city. Letters are now charged 1 cent for city delivery instead of 2, as heretofore.

Application of the Telegraph for a Fire Alarm.

On the evening of the 21st ult. according to a recommendation of Mayor Quincy of Boston to adopt a system of *Signals* communicating with the fire engine houses of that city, so that from some ceutral point, information might be communicated by the electric wires, to every station at one and the same time; and so that again, information might be transmitted, at one and the same time, from any one engine house to all the others, as well as to such central point; and thus make known on the instant, and all over the city, the moment when, and the place where, a fire breaks out.

The recommendation having been carried out and the wires all connected, at a meeting of the Common Council on the night mentioned above the members took a recess for a few minutes, and repaired to the telegraphic office to examine this new apparatus—which excited their surprise and admiration.—It was put in operation, and while they were present, a communication was had with New York; the wires of this city, so many miles distant, being connected with this fire alarm apparatus in Boston,—the correspondent in New York immediately sent on his reply by the same wires, the electrical action upon which instantly caused the deep-toned bell connected with the apparatus near the City Hall, to be rung; this great fire alarm bell being thus sounded in that city by the operator at the telegraphic office in New York! Directly after, and while the New York operator was ringing the bell, the other bells there were rung by persons ignorant of what was going on, and, supposing there was in reality a fire in that city, the whole fire department at once turned out.

Chamberlain's Drawing Board.

We have now in our possession one of Mr. Wm. Chamberlain's continuous-scale drawing boards, which was published and illustrated in No. 2, vol. 3 Scientific American. The board is a very neat one and exceedingly useful and convenient to any draftsman, as all the angles and degrees are laid out on the frame so that the draftsman will be enabled, especially for isometrical drafting, to execute drawings in one half the time usually occupied for that purpose.

This drawing board will afford an excellent opportunity for some man of capital to manufacture the same, as they would soon be introduced into all the public schools.

A cotton factory is about to be established at Washington, (D. C.) $20,000 of the stock has already been taken.

Inventors' National Institute.

MESSRS. EDITORS.—I have just finished and enjoyed a long anticipated treat in looking over the last eight numbers of your paper, having just returned from a visit of some eight weeks to the city of Baltimore, Md., where, I am happy to say, the inventors of that city and neighborhood, having the assistance of some of their most benevolent capitalists, have formed an Inventor's National Institute for the ostensible purpose of assisting and sustaining that most valuable class of our citizens, the Inventors, in their praiseworthy efforts in the production of such appliances as multiply the means of production, better the condition and more perfectly supply the wants of the world. They are now preparing to hold a Convention of Inventors in that city, on Tuesday, the 6th of March, 1849. They have had several newly invented machines presented to them by inventors for the consideration, approval and assistance of the institution. Among them is a plan for Washing Gold, which embraces about as pretty a piece of philosophy as I have ever seen exhibited in any machine. It is calculated to separate the gold whether in large or small pieces, from all kinds of foreign matter, from fine dust or sand to three or five pound stones at one operation, and will do the work of twenty men at least.

This machine fully evinces how ready and prolific is that peculiar talent of the inventor. No sooner is a machine needed to accomplish a new object or purpose, than the inventor's intellect is able to bring it into existence. I have often thought what would we be as a nation without the advantages derived from their skill and ingenuity. Take from us at this time the Printing Press, as improved within the last ten years, the Power Loom, the Cotton Gin, the Steam Engine, Steamboats, Railroads and Locomotives, and what an awful state of affairs we should be reduced to. The truth is, we have not properly appreciated our inventors, but have suffered them to be insulted, robbed and abused; we have looked upon them with distrust and held their employments in low estimation, when in fact to us they are indispensible to our future progress.—But we hope this Institution will correct these abuses, as inventors may apply here for assistance, without the influence of wealth, power, or some great name, and he will be met with a cordial reception and respect. The merits of his invention will be his passport.

A SUBSCRIBER FROM THE BEGINNING.

Mount Holly, Dec. 26, 1848.

Patent Rights.

MESSRS. MUNN & Co.

Gentlemen.—In the Boston Daily Advertiser of Nov. 23, may be found a report of the case Adams vs. Edwards, which may be deemed a counterbalance to the alarming doctrines promulgated in the case of Wilson vs. Packard, formerly published in your paper.

The following extract relates to points of general interest:—

"United States Circuit Court.—Woodbury J. ruled—

1. That if the patentee was the first to conceive the idea, and devised his plan, and had the whole in embryo, he was the *inventor* in the sense of the patent law, although an independent subsequent inventor should have first perfected a safe (the article in dispute,) and put it into use, provided that the patentee in the interval, was prosecuting his attempts with reasonable diligence, and finally proceeded with like diligence, to the completion of his Safe and to the necessary steps for obtaining a patent. That the jury in deciding upon the question of reasonable diligence, should consider the circumstances of the patentee, his poverty and the other duties in which he was necessarily or properly engaged.

2. That a public use or sale of the thing with the knowledge and consent of the inventor, is not a dedication under the patent act of 1839, sec. 7, unless such use or sale was more than two years before the application for a patent.

There are other points of interest decided in the case. I would take the liberty of making one remark. I have no doubt that the jury should consider the *poverty* of the patentee, upon the question of reasonable diligence, but I very much doubt whether an inventor should be allowed the right of prosecuting any business in which he may be "properly engaged," and in the meantime suffer his invention to lie dormant for more than two years. Further reflection might perhaps incline me to reconsider my opinion, but such are my present views. Yours, &c.

J. M. O'B.

Brunswick, Me. Dec. 18, 1848.

Extracts arranged from Leonard's Mechanical Principia.

What are the number of cubic feet of water, passing over a dam per second, the water being 16, 25, 40 and 60 inches deep and the length of the dam 40 feet.

For the 16 inches 5.24 cubit feet.
" 25 " 10.22 "
" 40 " 20.71 "
" 60 " 37.80 "

Let each of these be multiplied by 40 the length of the dam and it will give the number of cubic feet of water passing over the dam per second.

Let us take the first.—16 inches is 5.24X 40=209.60 cubic feet.

Required the number of horse power that 20 cubic feet of water per second will produce if applied to an overshot wheel 12 feet in diameter?

Answer 18.18 horse power.

The power of a breast wheel with a fall of 15 feet and a supply of 30 cubic feet of water per second, is 34.08 horse power.

We understand that the key to this valuable work will be published in a short time, and we are waiting for it, as there is some difference of opinion respecting the power of water.

Patent Office Report for 1847.

The *full* Report of the Patent Office for 1847 has but just been issued from the press of Wendell & Van Benthuysen, the Government Printers. It was presented on the 1st of January, 1848, and since that time it has been been travelling for nearly 365 days around the cases and presses of the imperial printing office. The Report has been printed in detachments, some of which we have noticed before, but not till now have the *Patent Claims* been issued. The Report is a very valuable one, especially the opinion of Justice Cranch on the Patent appeals. The matter is by far too good to be found in company with such miserable paper and typography. Over this the Patent Office has no control, for which we are not a little sorry.

The Report of the Commissioner for 1848, will soon be presented, and we hope that it will be printed sooner than the last.

Coal in Rhode Island

We have several times called attention to the interesting and important evidences of the existence of Coal in that State. Mr. Ridgway a geologist from Pennsylvania, who has been for some months examining various localities with the view of ascertaining the fact, in this case opened a thick bed of coal of very good quality in Cranston, last Friday. We have received a specimen of the Coal, which burns very freely in a close stove.

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our interest to have among us, for he is scientific and skilful. We do not want evil disposed, nor proud, nor lazy foreigners among us, but the honest, industrious and intelligent foreigner should not be viewed " with look askance," and Mr. Bain comes from a country where " stranger is a holy name."

We are the defenders of Mr. Morse as the inventor of the " Electro Magnet Telegraph." The insinuations that have been thrown out to dim his well-earned fame for that invention, we believe to be wicked and unjust. Is Fair Play satisfied !—Ed.

As this is a controversy which interests the whole people of these United States, we claim the indulgence of our readers for the unusual length of these two articles. The only apology that the Editor offers for the length of his is " the want of time to write a shorter one," *multum in parvo* being our rule.

American Cotton and Cotton Manufactures.

The following article, abridged from the Philadelphia North American and U. S. Gazette, is a good answer to our queries in the Scientific American of last week. In reference to political opinions, we express none,—it is out of our line, but we publish the article because it contains new and important information.

" It is a fact not generally known on this side of the Atlantic, that the principal imported cotton goods, which enter into competition with those made in this country, are manufactured almost exclusively of cotton grown in the British East India possessions, which, on an average for a succession of years, costs one penny, or two cents of our money, per pound less than the American cotton.

To illustrate this fact more clearly, it should be known that no cotton twist, or warp, from Nos. 5 to 20, except occasionally for home use, has been spun in England, within the last 20 years, of any thing better than East India cotton ; and that all cotton filling, or weft, under No. 30 is spun of the same material. In this country the factories rarely, if ever, spin, for manufacturing purposes, any cotton yarn finer than the numbers above named ; and they use the American cotton exclusively, at an average cost of two cents per pound above the value of the cotton used by the British manufacturer in making the same fabrics.

In addition to the advantage of an average of two cents per pound in the price of the raw material used, the British manufacturers have labor much cheaper—machinery much cheaper—money in abundance and at a much cheaper rate of interest, say generally at from 2 to 3 per cent. per annum on their business paper. They have large capitals embarked in their business—they have secured to them, beyond all doubt of contingency, both the home and the colonial markets, embracing at present a population exceeding two hundred millions, who are clothed almost exclusively from the British manufactories. And they have a government of extraordinary sagacity and judgment in all matters of business, to watch over, protect and extend and open new markets for them. But we of the United States have not even a home market on which to depend. With us, business of manufacturing is considered so precarious and unstable, that no capitalist is inclined to embark in it to that extent which would be likely to ensure success. Consequently the business is engaged in by chartered companies ; who, for many good reasons, rarely succeed well; or by individuals with means, for the most part, entirely inadequate to the undertaking. Machinery is expensive, and the advantage of extensive operations are such that in ninety-nine cases out of a hundred, in the vain hope of being able to compete with the British manufacturer, the entire capital is absorbed in machinery, and as cotton and other materials used in manufacturing are generally sold for cash, or on a very short credit—as all wages are paid weekly or monthly in cash; and the goods, when manufactured, are sold on a credit of eight months, in conformity with the terms on which the foreign goods are sold in our markets, it may be conceived that American manufacturers are constantly exposed to suffer from high rates of money and bad markets.

These facts, of so much interest to American cotton planters will be clearly demonstrated by reference to the tabular statement contained in Wilmer & Smith European Times, by which it will be seen that, from the first of January to the fifteenth of October, 1846 when the tariff of 1842 was in full operation 1,002,150 bales from other countries, were consumed in G. Britain. During the same year, it was estimated that there were over 400,000 bales of American cotton consumed in this country by our own manufacturers ; making an aggregate of 1,502,150 bales of Amercan cotton consumed in both countries. Only about one sixth of that number of bales the product of other countries, it will be remembered, was consumed during that period. From the same authority it appears that from the first of January to the thirteenth of October, in the year 1847 when the tariff of 1846 was in operation there were consumed in Great Britain only 636,550 bales of American cotton and 242,630 bales of the product of other countries. And it is estimated that, owing to the distressed situation of our manufactures, there were not more than 300,000 bales consumed in this country ; making only 936,560 bales of American cotton actually consumed in both countries during that period. It will be seen from these statements that whilst the consumption of American cotton decreased 565,590 bales under the tariff of 1846, the consumption of cotton grown in other countries increased 2250 bales ; and further, that nearly one third of all the cotton consumed in Great Britain during the period last named, that is unthe tariff of 1846, was imported from British possessions ; and the reason for this large increase in the consumption of other cotton, is obvious, the English manufactories were mainly engaged in producing coarse fabries, which constituted almost the only description of cotton goods they could send here to advantage and which were the best calculated to break down the manufacturing establishments of this country.

As to a question that is frequently asked, viz : Why cannot our manufactories enter into competition with those of Great Britain (a question which the enemies of protection aver has never been satisfactorily answered) a reply may be easily given—they can compete with any nation on the face of the earth if placed on the same footing. It is a well-established fact, that there is nowhere a more industrious, ingenious and enterprising people than the Americans. If they were protected and fostered, as the industrious classes of Great Britain are and always have been, American workmen would soon be able to manufacture every pound of cotton produced in the United States.

Useful Hints to Public Speakers.

It is a curious fact in the history of sound, that the loudest noises always perish on the spot where they are produced ; whereas, musical notes will be heard at a great distance.—Thus, if we approach within a mile or two of a town or village in which a fair is held, we may hear faintly the clamor of the multitude ; but more distinctly the organs and other musical instruments which are played for their amusement. If a Cremona violin, a real Amati, be played by the side of a modern fiddle, the latter will sound much louder of the two ; but the sweet, brilliant tone of the Amati will be heard at a distance the other cannot reach. Dr. Young, on the authority of Denham, states that at Gibraltar the human voice may be heard at a greater distance than that of any other animal. Thus when the cottager in the woods or in the open plain wishes to call her husband, who is working at a distance, she does not shout but pitches her voice to a musical key, which she knows from habit, and by that means reaches his ear. The loudest roar of the largest lion could not penetrate so far. "This property of music in the human voice," says Cowper, "is strikingly shown in the Cathedrals abroad. Here the mass is entirely performed in musical sounds and becomes audible to every devotee, however placed in the remotest part of the church whereas, if the same mass had been read, the sounds would not have travelled beyond the precincts of the choir." Those orators who are heard in large assemblies most distinctly and at the greatest distance, are those who, by modulating the voice, render it more musical. Loud speakers are seldom heard to advantage.

Burke's voice is said to have been a sort of lofty cry, which extended, as much as the formality of his discourse, in the House of Commons, to send the members to their dinner.—Chatham's lowest whisper was distinctly heard " his middle tones were sweet, rich, and beautifully varied," says a writer, describing the orator ; "when he raised his voice to the highest pitch, the House was completely filled with the volume of sound, and the effect was awful, except when he wished to cheer or animate—and then he had spirit-stirring notes which were perfectly irresistible The terrible however, was his peculiar power. Then the house sunk before him ; still he was dignified, and wonderful was his eloquence, it was attended with this important effect, that it possessed every one with a conviction that there was something in him finer even than his words ; that the man was greater, infinitely greater, than the orator."

The Dark Races and the Fair.

There is one thing obvious in the history of the dark races, that they all, more or less, exhibit the outlines of the interior more strongly marked than in the fair races generally. Thus the face of the adult Negro, or Hottentot, resembles, from the want of flesh a skeleton over which has been drawn a blackened skin. But who are the dark races of ancient and modern times ? It would not be easy to answer this question. Were the Copts a dark race ? Are the Jews a dark race ? The Gipsies ? The Chinese, &c. ? Dark they are to a certain extent ; so are all the Mongol tribes ; the American Indian and Esquimaux ; inhabitants of nearly all Africa, of the East of Australia. What a field of extermination lies before the Saxon, Celtic, and Sarmatian races! The Saxon will not mingle with any dark race, nor will he allow him to hold an acre of land in the country occupied by him ; this at least, is the law of Anglo-Saxon America. The fate, then, of the Mexicans, Peruvians, and Chillians is in no shape doubtful. Extinction of the race, sure extinction ; it is not even denied. Already in a few years the English have cleared Van Dieman's Land of every human aboriginal ; Australia, of course, follows ; and New-Zealand next, There is no denying the fact, that the Saxon, call him by what name you will, has a perfect horror for his darker brethren. Hence the folly of the war carried on by the philanthropists of Britain against nature ; of these persons some are honest, some not. We venture to recommend the honest ones to try their strength in a practical measure. Let them demand for the native of Hindostan, of Ceylon, or even of the Cape or New-Zealand, the privileges and rights wholly and fairly of Britons ; We predict a refusal on the part of the Colonial office. The office will appoint you as many aborigine protectors as you like, that is spies ; but the extension of equal rights and privileges to all colors is quite another question.

Franklin's Resting Place.

"Such was his worth, his loss was such,
We cannot love too well, or grieve to much "

In one corner of the burying ground, best known as Christ's Churchyard, Philadelphia, repose the remains of Franklin. On entering the churchyard from Arch street, attention will unavoidably be directed to his humble tomb by a well trodden path which leads from the gate to the marble slab which bears the simple inscription, which will at once strike the beholder with wonder, viz : " Benjamin and Deborah Franklin." With wonder, we say, because we are accustomed to see the stones covering the tenements of great men inscribed with eulogiums : but the one we are now beholding has nothing but the words above quoted, and the year in which it was placed there.

And this is the grave of a man who might once have been seen a runaway boy, in the streets of Philadelphia, seeking employment as a printer ; and again, as editor and proprietor of the United States Gazette, long so ably conducted by Mr. Chandler. Once trying experiments with a simple paper kite ; again, astonishing the world with the discoveries made through its instrumentality. Once in England as a deceived journeymen printer ; again as Minister from an Independent Republic. Once in his workshop, as a laboring mechanic ; again in the Hall of Legislation, advocating the cause of freedom, and urging an oppressed people to rise and drive the British Lion from our forests. Yes, he was one of those who signed away their lives, fortunes and honors, necessary for the welfare of their fellow-citizens.

But all this could not save him from the hand of death. Though the Philosopher and the Statesman must lie as low as the less favored, yet the circumstances, connected with the lives of those whose motto was "*non sibi sed patræ*," possess charms which all can appreciate and all love to cherish. We read his name on the marble slab—ponder over his virtues, and mourn his loss, as of a dear friend. We stand around his grave, and think how many have gazed with reverence upon that stone, and our eyes become fixed upon it as though it possessed an endearing charm. We look back on his life and deeds, and when we remember that a nation wept when Franklin died, we cannot refrain from dropping a tear over his last abode.

No towering monument rears its head above the clouds where the first beams of the rising sun will gild his name ; but that name is inscribed in characters not easily to be erased, on every liberty loving heart, and so long as Philosophy continues to be a science, benevolence a virtue, and liberty the watchword of the American people, will his memory be cherished, and his name be honored.

Law and Lawyers in Norway.

The administration of the civil law in Norway is most admirably contrived. In every school district, the freeholders elect a Justice of the Court of Reconciliation. Every lawsuit must first be brought before this Justice, and by the parties in person, as no lawyer or attorney is allowed to practice in this Court. The parties appear in person, and state their mutual complaints and grievance at length, and the Justice carefully notes down all the facts and statements of the plaintiff and defendant, and after due consideration endeavors to arrange the matter, and proposes for this purpose, what he considers to be perfectly just and fair in the premises. If his judgement is accepted, it is immediately entered in the court above, which is a court of Record ; and if it is appealed from, the case goes up to the District Court, upon the evidence already taken in writing by the Justice of the Court of Reconciliation. No other evidence is admitted. If the terms proposed be just and reasonable, the party appealing has to pay the costs and charges of the appeal. This system of minor courts prevents a deal of unnecessary, expensive and vexatious litigation. The case goes up from court to court upon the same evidence, and the legal argument rests upon the same facts, without trick or circumlocution of any kind from either party. There is no chance for pettifoggers,—the banditti of the bar. Poor or rich or stupid clients cannot be deluded, nor Judge or Jury mystified by the skill of sharp practitioners in the courts of law in Norway. More than two-thirds of the suits commenced are settled in the Court of Reconciliation, and of the remaining third not so settled, no more than one-tenth are ever carried up.

The judges of the Norwegian court are responsible for errors of judgement, delay, ignorance, carelessness, partiality or prejudice. They may be summoned, accused, and tried in the Superior, and, if convicted, are liable in damages to the party injured. There are, therefore, very few unworthy lawyers in the Norwegian courts. The bench and the bar are distinguished for integrity and learning.—They have great influence in the community, and the country appreciate the many benefits which have resulted from their virtue and their wisdom

Crystals which form in different liquids, are generally more abundant on the side of the jar exposed to the light; and it is well known that still water, cooled below 35°, starts into crystals of ice the instant it is agitated.

Truth is a hardy plant : and when once firmly rooted, it covers the ground so that error can scarce find root.

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TO CORRESPONDENTS.

"L. M. W. of N. Y."—From the model last received from you we perceive your genius is taking a new turn. We have no hesitation in saying that your last invention is the best one you ever presented to us for examination. It is certainly worth a patent and there is not a farmer in the country but what will patronize your invention as soon as it becomes known to him. Our fee for attending to your business, making the two sets of drawings, writing the specification, forwarding the model &c. will be 20 dollars besides the Patent office fee which is $30 more. We understand your model perfectly well and it is quite sufficient for the Patent Office when accompanied with such drawings as we are accustomed to send.

"C. D. F. of Wis."—Your principle for producing the drummond light is not new and we should advise you to abandon the idea of getting letters patent. The principle of your water wheel possesses too much of the "Yankee Turbine" to claim as new, and we should also advise you to abandon that project too.

"J. A. & Sons, of Mass."—We are waiting anxiously for the return of those papers Please send them along.

"J. C. of Savannah."—We have examined the letter to which you refer and find that we were correct in our former statement. Mr. O.'s name was not contained in it. We have now forwarded to Mr. O. the back Nos. of this vol. and entered his name as per you request. Many thanks for your continued kindness.

"N. G. S. of Mass."—The Rule of the Bevel is there different from the manner we insert such things—and on the responsibility and expence of the author. Yours can receive the same favor, which you will see is nothing more than right, as the rules are to be found so correct for all in Scott's Work.

"B. A. of R I."—We have noticed the Altituder in the Franklin Journal before.

"C. L. of Conn."—Give your rule more attention in compound numbers, and tell us the result.

"J. C. of Mass"—Your patent will likely be issued next week.

"H M. C. of Ohio"—We are not aware that any institution has ever made an offer for a machine to bore brush blocks. They are very extensively used in Lansingburg, N. Y.

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"R. H. A. of Mich."—Your business shall be attended to as soon as your model comes to hand. Our board of examiners are second only to the company of examiners under Hon. E Burke at the Patent Office Washington, and you can rely upon your business being faithfully attended to by us. Your invention is an important one and we do not blame you for being particular that it be placed in responsible hands for attention.

"R. D. of Pa."—The wood cuts you order, have been previously sold.

"W. W. of Penn."—We cannot furnish you with the first Nos. of Vol. 3, as the they are all exhausted, the $3 has been applied to your subscription account.

"L B. S. of Ga."—The Engineer's Magazine is published in Glasgow, and we are not aware that an agency has been established for its sale in New York.

"J. P. of N. Y."—Your Water Wheel presents nothing particularly new, therefore we would advise you to abandon the idea of making application for the letters patent. The principles combined in it are the same as a model now in our office, which has been rejected by the Commissioner of Patents. The specifications and drawings were executed at another agency and proved defective. We are now engaged in modifying the whole matter, and if we succeed in securing Letters Patent, (and there seems a strong probability) the whole ground will be covered, and of course will preclude the possibility of your success

"T. J. of Pa."—You will get your letter at Harrisburg.

"A. B. of Va."—We have answered you by mail, also "C. & K. of Mich."

"N. W. H. of Va."—We have deposited $50 with Messrs. A. B. & D. Sands in compliance with your request. The receipt for the money paid to Messrs. S. we will send you in a few days.

"H. M. of Mass."—Your model has been received, but for want of time we shall not be able to examine it *thoroughly* until next week, the principle seems to be good, and doubtless you will succeed; you will hear from us in a few days.

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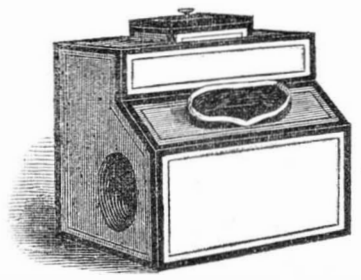

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WALKING BEAM ENGINE.

THE engine and boiler represented in No. 9 of present vol. of the Scientific American is again for sale. Several opportunities for disposing of it have been offered and refused in consequence of its having been sold to a gentleman from the country but now he expresses his inability to meet the terms which we require (cash in advance) and the engine is therefore offered for sale again. Any person now desiring it can have it shipped to his address for $150 cash which is $25 less than it is actually worth. Address MUNN & CO.
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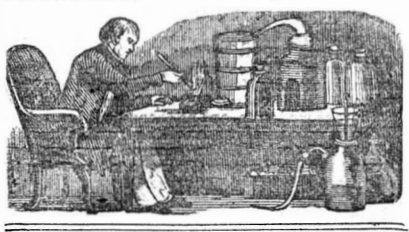


For the Scientific American.

New Chemical Law.

No. 16.

There is no doubt but that many persons will consider this new chemical law, as a speculation merely, based entirely upon mental evidence, and that it is therefore of no practical benefit to chemical science. To all such I would say that they are wrongly impressed and do not understand the subject, since it is based entirely upon certain indisputable facts, which are new to science and of the greatest importance to its advancement. It is in fact of no particular importance whether this principle of aggregation is believed or not, since it will not in the least degree influence the facts upon which it is based. In this respect it is precisely similar to the atomic theory of Dalton which is a speculation based upon the fact, that substances combine with each other in definite and multiple proportions. It matters not, therefore, whether the atomic theory of Dalton is believed or not, the facts upon which it is based are indisputable. In this essay it may be seen that I have introduced the law as developing the facts, in order that both the speculations and the facts might be the better understood, although I could have shown the facts as existing independent of any speculation. I chose rather to combine the two, so that if any one rejects the speculations they must believe the facts. I have not given the facts separate from the speculations and for this reason many may be led to ask, where are the facts? To answer such an enquiry I will introduce the following examples of isolated facts, the greater part of which I claim as new and of the utmost importance.

1st. Chlorine, bromine and iodine are nearly similar to each other in their chemical proportions.

2d. All the compounds of chlorine, bromine and iodine, which possess similar atomic constitutions, are also nearly similar to each other in their chemical properties.

3d. Chlorine, bromine and iodine, when arranged so that their atomic weights form an increasing series, will possess specific gravities also forming an increasing series.

4th. All compounds of chlorine, bromine and iodine possessing similar atomic constitutions, when arranged so that their atomic weights form an increasing series, will possess specific gravities also forming either an increasing or decreasing series depending upon the specific gravities of the substances uniting

5th. Chlorine, bromine and iodine and all their compounds possessing similar atomic constitutions when arranged so that their atomic weights form increasing series, will possess boiling points invariably forming increasing series.

The above are simply facts and involve no speculations whatever, and any person who will take the trouble to examine the above facts will find no exceptions. This is not confined to the above example, but extends also to all other classes of substances whatever, which possess similar chemical properties and similar atomic constitutions. It is to be hoped therefore that chemists will take this subject into consideration and test it thoroughly. They may reject the speculations if they choose, but they must admit the facts, which are indisputable.

By collecting the true specific gravities and boiling points of classified substances, we shall be enabled to discover their respective Laws which govern them, and shall then be enabled to correctly calculate them, without experiment. All will admit that this is desirable, yet it can be accomplished by a very few experiments, which I hope will be instituted for that purpose.

With these remarks I will close the subject feeling confident that any person who will take the trouble to examine it will be amply repaid by the truth it unfolds. S. N.

Bridgeport, Conn.

Making Colors.

We have tested these receipts and found them to be correct and good. They will only answer on wool and silk, or both combined For cashmere delaines they are the grand desideratum. A few French color makers have recently arrived in this country to execute these colors in some of our print works. They are given to our readers as peculiarly valuable for that branch of business. The stuffs will be all the better to be made a little stronger than is defined in the specification. —so we have found in testing them. $2000 was paid for the receipts about two months ago by an eminent Calico Printing Establishment near this city.

The coloring matters hitherto employed in printing textile fabrics composed of wool, of silk, and of wool and silk combined, are usually in the state of extracts which are obtained by aqueous solutions from various kinds of dyewoods, and from other substances, such as orchil, cochineal &c. and by evaporating more or less, these extracts. But it often occurs that in using boiling water to extract these coloring matters, several other soluble substances are extracted along with them, so that when an aqueous solution of any coloring matter is evaporatad, the residum retains a great deal of these extraneous substances, and therefore produces colors, less brilliant than if it were isolated and pure. All aqueous solutions, particularly highly concentrated ones, deposit in the course of time the whole of the coloring matter which is in the state of suspension, and likewise, in the majority of cases, a resinous substance, which has probably mixed up with it a portion of the coloring matter. And as the concentration or strength of the extract diminishes in proportion as the deposit increases, it follows that the liquor in any two vats must always vary more or less in strength, according as one may have stood longer than the other. Now such differences of intensity cause irregularity in the printing of goods; and there are still greater differences caused by these extracts not having equal affinities for water, and consequently some have a greater tendency than others to absorb steam, from which causes combined steam printing (*le vaporisage*), is rendered an operation extremely uncertain in its effects and very liable to accidents. This process has been known by the name of dry dyeing (*teinture seche*) which wrongfully implies that water is not necessary, which however is not the case, for all manufacturers are careful to keep their goods moist which they wish to fix with the colors, either by placing them in a humid atmosphere or by damping them during the process of steaming, by opening the steam cock a little at the commencement of the operation, so that the steam which escapes may be condensed upon the goods and thereby impart to them the proper degree of humidity. Without these precautions the colors would be feeble and spotty in appearance, unless, indeed the colors can be previously rendered equally lygrometric, which it is an extremely difficult thing to effect. If two pieces of the same printing fabric are submitted to the process of steaming, one very dry and the other very damp, the color of the first will be spotted and feeble, while the second will be bright and full bodied. All printed woolen goods, with the exception of those which are printed with colors, which like the French Blue, have a great afinity for water, require in order to fix firmly the color, to have condensed upon them the largest possible quantity of steam, either before or during the process of steaming but without the quantity being so large as to allow of running (*coulage*) and if it should happen that in the same piece, and by one and the same operation, the color runs in one part, is weak in another, or is clear and decided in a third, it must arise from the piece not having in all parts an equal affinity for water.

To remedy the various inconveniences arising fron the use of extract in steam dyeing, (*vaporisage*) it is necessary to replace those extracts by preparations in which the coloring matters are in a purer and more unalterable state and which are such that they may be fixed in the goods in an uniform manner, and at a degree of humidity as analagous as possible to that of the dyeing bath; and this is what has been effected by the following processes.

These improvements are founded on the general fact, that if to a decoction of any coloring matter, there be added a salt, such as the chloride of tin, the base of which has a great affinity for the coloring matter, an insoluble precipitate is the result, which holds very little, if an extraneous soluble matter, and contains the coloring principle in a state of much greater purity than the ordinary extracts.

Although such an extract is insoluble yet it is capable of combining perfectly with the textile fabrics aforsaid provided that the drying be performed while the goods are well damped. In consequence of the insolubility of this precipitate, the color obtained by means of it, may be fixed by steam without any previous dissication, and goods which may have been dried after printing may be again wetted without the danger of the colors running. The precipitates which may be thus obtained and applied, are numerous, but as they are all very similar in effect, it may suffice to specify only those which appear to be most susceptible of general use.

(*To be concluded*)

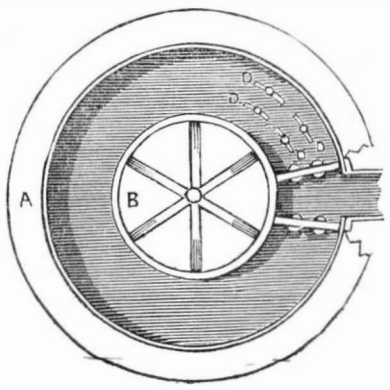
History of the Rotary Engine.

Prepared expressly for the Scientific American.

WILCOX'S ROTARY ENGINE.

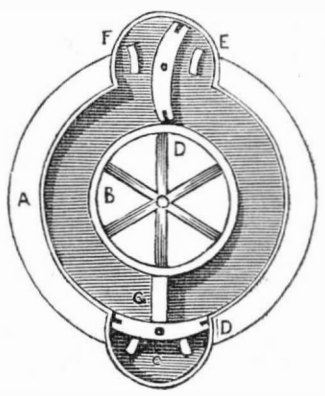
This is a rotary engine of Mr. Wilcox—the inventor of the one in our last number and as it is very different, it is worthy of a place in our history.

FIG. 29.



A is the outside fixed cylinder. B, the inner or revolving cylinder, D D, two or more pallets working through a deep stuffing box, and turned by a lever or other power from the external part of the engine alternately flat or edgewise; the pallets D D, are fixed to the revolving cylinder, E is the steam passage—the one to the condenser is not shown.

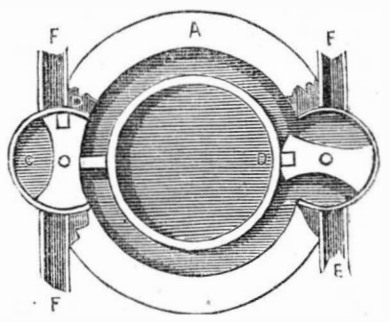
FIG. 30.



This is what is called a top or bird's eye view. A is the outer or fixed cylinder. B the inner or revolving cylinder. C C, the pallet, used as a cock, or a portion of a circle fitted accurately to the circle it describes with a spindle working through the top of the cylinder. D is a groove into or against which the part coming in contact with the revolving cylinder is secured with a piece of chilled iron in order that the constant friction of the revolving cylinder should not injure the pallet. E is the passage from the boiler, and F that to the condenser. G is the pallet secured to the working cylinder. In this figure two portions of circles and eocks are introduced to shew their situations clearly.

Fig. 31 is another top view of a rotary engine —all these being modifications of one principle, which shews the want of principles in the construction of these engines for steam *moters*. Cocks are used in this engine to regulate the steam in place of valves. A is the outer or fixed cylinder with a fixed pallet. C C, the cocks which are wrought from the out-

FIG. 31.



side of the engine, by a spindle passing through the top. D is a piece of chilled iron in the cock to resist the friction of the revolving cylinder, as explained in last figure. E is the steam passage and F the passage to the condenser.

There would certainly be a great difficulty in fitting the pallets of fig. 29 close at the joints to prevent leakage --a great difficulty in rotary engines, and the two latter modifications contain the same elementary principles of construction and operation, as the engine of Mr. Flint, in No. 14 Scientific American, and they have the very same defects.

Interesting Experiment.

A writer in the Batavia (N. Y.) Spirit of the Times, suggests that the phenomenon of the variation of the compass, may be in some way dependent upon the equally unaccounted for existence of the Aurora Borealis. On the morning of the 18th ult., he says, when the whole southern hemisphere was filled with a redish light, accompanied by the usual appearance, under similar cireumstauces, in the north, he placed the needle of a surveyor's compass upon the magnetic meridian, and observed that it inclined with an uneasy, restless motion, three and a half degrees towards the east. As the Aurora died away, the needle retrogaded with the same motion as before to its original position. He supposed that as the Aurora may exist without necessarily being visible, the same influence may at all times manitest itself on the magnetic needle.

This was the opinion of Oersted, and it is generally admitted to be correct by electricians.

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